Facility Facts & Figures

The National Synchrotron Light Source (NSLS) is a national user research facility funded by the U.S. Department of Energy's Office of Basic Energy Science. The NSLS operates two electron storage rings: an X-ray ring (2.8 GeV, 280 mA) and a Vacuum Ultraviolet (VUV) ring (800 meV, 1.0 A) which provide intense light spanning the electromagnet spectrum from the infrared through x-rays. The properties of this light, and the specially designed experimental stations, called beamlines, allow scientists in many fields of research to perform experiments not otherwise possible at their own laboratories.

Over 2200 scientists representing almost 400 institutions, 65 of them corporations, come to Brookhaven National Laboratory annually to conduct research at the NSLS. The facility operates 7 days a week, 24 hours a day, throughout the year, except during periods of maintenance and studies.

As a national user facility, the NSLS does not charge for its beamtime, providing that the research results are published in the open literature. Proprietary research is conducted on a full cost recovery basis.

There are two ways to obtain beamtime at the NSLS: either as a General User or as a member of a Participating Research Team (PRT). General Users are independent investigators interested in using the NSLS for their research. Access is gained through a peer-reviewed proposal system. All operational beamlines at the NSLS reserve at least 25% of their available beamtime for General Users. PRTs are groups of researchers with related interests from one or more institutions. Membership in a PRT is open to all members of the scientific community who can contribute significantly to the program of the PRT, (i.e., funding, contribution of equipment, scientific program, design and engineering, operations manpower, etc).

The NSLS currently has 58 X-Ray and 22 VUV operational beamlines for performing a wide range of experiments. The following pages list the operational beamlines at the NSLS and their unique characteristics.

BEAMLINE GUIDE

TECHNIQUE	DESCRIPTION
ARPES	UV PHOTOELECTRON SPECTROSCOPY, ANGLE-RESOLVED
DAFS	X-RAY DIFFRACTION ANOMALOUS FINE STRUCTURE
DEI	DIFFRACTION-ENHANCED IMAGING
EXAFS	X-RAY ABSORPTION SPECTROSCOPY, EXTENDED FINE STRUCTURE
HARMST	HIGH ASPECT RATIO MICROSYSTEMS TECHNOLOGY
IRMS	INFRARED MICROSPECTROSCOPY
MAD	MULTI-WAVELENGTH ANOMOLOUS DISPERSION
NEXAFS	NEAR EDGE X-RAY ABSORPTION SPECTROSCOPY
SAXS	SMALL ANGLE X-RAY SCATTERING
SPARPES	UV PHOTOELECTRON SPECTROSCOPY, SPIN- AND ANGLE-RESOLVED
STXM	SCANNING TRANSMISSION X-RAY MICROSCOPY
UPS	UV PHOTOELECTRON SPECTROSCOPY
UV-CD	ULTRAVIOLET CIRCULAR DICHROISM
WAXD	WIDE-ANGLE X-RAY DIFFRACTION
WAXS	WIDE-ANGLE X-RAY SCATTERING
XAS	X-RAY ABSORPTION SPECTROSCOPY
XMCD	X-RAY MAGNETIC CIRCULAR DICHROISM
XPS	X-RAY PHOTOELECTRON SPECTROSCOPY
XRD	X-RAY DIFFRACTION
XSW	X-RAY STANDING WAVES

BEAMLINE	SOURCE	TYPE OF RESEARCH	ENERGY RANGE	ORGANIZATION
U1A	Bend	NEXAFS XAS	20-900 eV	ExxonMobil Research and Engineering Co.
U2A	Bend	High Pressure Research IRMS IR spectroscopy	30-8000 cm-1	Carnegie Institute of Washington
U2B	Bend	IRMS IR spectroscopy	50-4000 cm-1	Albert Einstein College of Medicine
U3C	Bend	XPS	50-1000 eV	Bechtel Nevada Lawrence Livermore National Laboratory Los Alamos National Laboratory Sandia National Laboratory
U4A	Bend	UPS	10-300 eV	Army Research Laboratory BNL-NSLS Boston University North Carolina State University Rutgers University University of North Carolina
U4B	Bend	XMCD X-ray scattering, resonant X-ray scattering, magnetic X-ray florescence XPS UPS	20-1200 eV	BNL-NSLS Montana State University
U4IR	Bend	IR spectroscopy IRMS	20-3000 cm-1	BNL-Chemistry BNL-NSLS
U5UA	Insertion Device	UPS ARPES SPARPES Magnetospectroscopy	15-150 eV	BNL-NSLS
U7A	Bend	NEXAFS XPS	180-1200 eV	BNL-Chemistry BNL-Physcis Dow Chemical Company National Institute of Standards & Technology Rutgers University Texas A&M University University of Michigan
U7B	Bend	XPS UPS NEXAFS	15-300 eV	BNL-NSLS
U8B	Bend	NEXAFS X-ray photoemission ARPES	100-1000 eV	IBM Research Division University of California @ Riverside University of Michigan
U9A	Bend	Photon-stim. Desorption	White Beam	BNL-NSLS
U9B	Bend	UV florescence UV-CD	0.8 - 8.0 eV	BNL-Biology BNL-NSLS
U10A	Bend	IR spectroscopy	30-20000 cm-1	BNL-NSLS BNL-Physics
U10B	Bend	IRMS	50-4000 cm-1	BNL-NSLS University of Saskatchewan
U11	Bend	UPS UV photoabsorption UV photoionization	3-30 eV	BNL-Biology BNL-NSLS

BEAMLINE	SOURCE	TYPE OF RESEARCH	ENERGY RANGE	ORGANIZATION
U12A	Bend	XAS	100-800 eV	BNL-NSLS Oak Ridge National Laboratory
U12IR	Bend	IR spectroscopy Time-resolved spectroscopy	2-400 cm-1	BNL-NSLS SUNY @ Stony Brook University of Florida
U13UA	Insertion Device	Focused white beam	3-1000 eV White Beam	BNL-NSLS
U13UB	Insertion Device	UPS ARPES	3-30 eV	BNL-NSLS BNL-Physics Boston University
U14A	Bend	XPS UPS	15-300 eV	BNL-NSLS
U16B	Bend	XPS	50-1000 eV	BNL-NSLS Rutgers University University of Texas Arlington
X1A1	Insertion Device	STXM	.25-.50 keV	BNL-Environmental Science BNL-NSLS ExxonMobil Research and Engineering Co. SUNY @ Plattsburgh SUNY @ Stony Brook University of Texas
X1A2	Insertion Device	STXM	.25-1 keV	SUNY @ Stony Brook
X1B	Insertion Device	X-ray scattering, resonant X-ray scattering, coherent ARPES UV fluorescence XAS	.2-1.6 keV	Boston University BNL-NSLS University of Groningen
X2B	Bend	X-ray microtomography	8-35 keV	ExxonMobil Research and Engineering Co.
X3A2	Bend	XAS SAXS XRD, single-crystal MAD	3-31 keV	SUNY @ Stony Brook
X3B1	Bend	XAS XRD, powder EXAFS	6-30 keV	SUNY @ Buffalo SUNY @ Stony Brook
X4A	Bend	MAD	3.5-20 keV	Albert Einstein College of Medicine City University of New York Columbia University Memorial Sloan-Kettering Cancer Center Mount Sinai School of Medicine New York Structural Biology Center New York University SUNY @ Buffalo The Wadsworth Center of the NYS Dept of Health Weill Medical College of Cornell University

BEAMLINE	SOURCE	TYPE OF RESEARCH	ENERGY RANGE	ORGANIZATION
X4C	Bend	MAD	7-20 keV	Albert Einstein College of Medicine City University of New York Columbia University Memorial Sloan-Kettering Cancer Center Mount Sinai School of Medicine New York Structural Biology Center New York University Rockefeller University SUNY @ Buffalo The Wadsworth Center of the NYS Dept of Health Weill Medical College of Cornell University
X5A	Bend	Laser backscattering	150-470 MeV	BNL-Physics Forschungszentrum Juelich (KFA) Norfolk State University Ohio University Syracuse University University of Paris University of Rome II University of South Carolina University of Virginia Virginia Polytechnic Inst. & State University
X6A	Bend	MAD	7-20 keV	BNL-NSLS
X6B	Bend	XRD, powder XRD, single-crystal	7-20 keV	BNL-NSLS
X7A	Bend	XRD, powder	5-45 keV	BNL-Physics Chevron Research & Technology Company Ohio State University SUNY @ Stony Brook University of Birmingham University of California @ Santa Barbara University of Pennsylvania
X7B	Bend	XRD, single-crystal XRD, time-resolved WAXS or WAXD	5-21 keV	BNL-Chemistry
X8A	Bend	Metrology	.26-5.9 keV	Bechtel Nevada Lawrence Livermore National Laboratory Los Alamos National Laboratory Sandia National Laboratory
X8C	Bend	MAD	5-19 keV	Biogen Incorporated BNL-Biology Hoffmann-La Roche National Research Council of Canada
X9A	Bend	MAD	5-15 keV	Albert Einstein College of Medicine Rockefeller University Sloan-Kettering Institute for Cancer Research
X9B	Bend	EXAFS XAS MAD NEXAFS	5-15 keV	Albert Einstein College of Medicine National Institutes of Health
X10A	Bend	XRD, time-resolved WAXS or WAXD XRD, powder X-ray reflectivity SAXS	6-15.2 keV	ExxonMobil Research and Engineering Co.
X10B	Bend	XRD, surface WAXS or WAXD XRD, powder X-ray reflectivity	14 keV	ExxonMobil Research and Engineering Co.

BEAMLINE	SOURCE	TYPE OF RESEARCH	ENERGY RANGE	ORGANIZATION
X10C	Bend	XAS NEXAFS EXAFS	4-24 keV	ExxonMobil Research and Engineering Co.
X11A	Bend	EXAFS NEXAFS XAS	4.5-35 keV	BNL-Environmental Science Canadian Light Source Hunter College Naval Research Laboratory Naval Surface Warfare Center New Jersey Institute of Technology North Carolina State University Northeastern University Paul Scherrer Institute U.S. Enivronmental Protection Agency Virginia Union University
X11B	Bend	EXAFS NEXAFS XAS	5.0-30 keV	BNL-Environmental Science Canadian Light Source Hunter College Naval Research Laboratory Naval Surface Warfare Center New Jersey Institute of Technology North Carolina State University Northeastern University Paul Scherrer Institute U.S. Enivronmental Protection Agency University of Connecticut Virginia Union University
X12A	Bend	Optics R&D	5-50 keV	BNL-NSLS
X12B	Bend	MAD	5-20 keV	BNL-Biology
X12C	Bend	MAD	5.5-20.0 keV	BNL-Biology
X13A	Insertion Device	Magnetospectroscopy XMCD X-ray scattering, resonant	.2-1.8 keV	BNL-NSLS
X13B	Insertion Device	Microdiffraction imaging X-ray microprobe	4-16 KeV	BNL-NSLS
X14A	Bend	XRD, single-crystal	5-26 keV	Oak Ridge National Laboratory University of Tennessee
X15A	Bend	XSW DEI	3-25 keV 10-60 keV	Argonne National Laboratory BNL-NSLS Canadian Light Source Illinois Institute of Technology North Carolina State University Northwestern University University of North Carolina University of Saskatchewan
X15B	Bend	NEXAFS XAS EXAFS	1.5-15 keV	SUNY @ Stony Brook
X16A	Bend	XRD, surface	4-12 keV	University of Illinois @ Chicago
X16B	Bend	XRD, powder XRD, surface	7.85 keV	
X16C	Bend	XAS	4.5-25 keV	University of Illinois @ Chicago
X17B1	Insertion Device	XRD, powder	67 keV 20-100 keV	BNL-Medical BNL-NSLS

BEAMLINE	SOURCE	TYPE OF RESEARCH	ENERGY RANGE	ORGANIZATION
X17B2	Insertion Device	XRD, powder High Pressure Research	20-100 keV	SUNY @ Stony Brook
X17B3	Insertion Device	High Pressure Research	20-100 keV	Brookhaven National Laboratory Carnegie Institute of Washington
X17C	Insertion Device	High Pressure Research XRD, powder XRD, single-crystal	5-80 keV	Carnegie Institute of Washington Lawrence Livermore National Laboratory Naval Research Laboratory University of Chicago
X18A	Bend	XRD, surface XRD, powder X-ray reflectivity XRD, single-crystal WAXS or WAXD	4-19 keV	BNL-Environmental Science Pennsylvania State University Purdue University University of Maryland University of Missouri
X18B	Bend	NEXAFS XAS EXAFS	5.7-40 keV	BNL-Chemistry BNL-NSLS Chevron Research & Technology Company General Electric North Carolina State University Rutgers University University of Kentucky UOP
X19A	Bend	EXAFS XAS NEXAFS	2-8 keV	BNL-Chemistry BNL-NSLS Chevron Research & Technology Company General Electric North Carolina State University Rutgers University University of Kentucky UOP
X19C	Bend	X-ray topography X-ray scattering, liquid X-ray reflectivity XRD, surface	6-17 keV	Army Research Laboratory Carnegie Mellon University Dartmouth College Johns Hopkins University National Aeronautical and Space Agency SUNY @ Stony Brook University of Chicago University of Illinois @ Chicago University of Wisconsin
X20A	Bend	Microdiffraction imaging XRD, surface	4.5-13 keV	IBM Research Division
X20B	Bend	XRD, surface	17.4 keV	IBM Research Division
X20C	Bend	XRD, surface XRD, time-resolved	5-11 keV	IBM Research Division
X21	Insertion Device	SAXS X-ray florescence X-ray inelastic scattering	5-10 keV	BNL-NSLS
X22A	Bend	XRD, surface XRD, time-resolved WAXS or WAXD X-ray reflectivity XRD, single-crystal	10 keV 32 keV	BNL-Environmental Science BNL-Physics Rutgers University University of Maryland
X22B	Bend	X-ray scattering, liquid XRD, surface	6.5-10 keV	BNL-Physics Harvard University Rutgers University

BEAMLINE	SOURCE	TYPE OF RESEARCH	ENERGY RANGE	ORGANIZATION
X22C	Bend	X-ray scattering, magnetic X-ray reflectivity XRD, surface XRD, single-crystal	3-12 keV	BNL-Physics Rutgers University University of Maryland
X23A2	Bend	DAFS XAS XRD, powder NEXAFS EXAFS	4.7-30 keV	BNL-NSLS
X23B	Bend	XAS XRD, powder EXAFS NEXAFS	3-10.5 keV	BNL-Environmental Science Canadian Light Source Hunter College Naval Research Laboratory Naval Surface Warfare Center New Jersey Institute of Technology North Carolina State University Northeastern University Paul Scherrer Institute U.S. Enivronmental Protection Agency Virginia Union University
X24A	Bend	XPS Auger spectroscopy XSW EXAFS X-ray fluorescence	1.8-5 keV	BNL-NSLS National Institute of Standards & Technology
X24C	Bend	XPS	.006-1.8 keV	Naval Research Laboratory
X25	Insertion Device	MAD	3-28 keV	BNL-Biology BNL-NSLS
X26A	Bend	X-ray microprobe Microdiffraction imaging	3-30 keV	BNL-Environmental Science University of Chicago University of Georgia
X26C	Bend	MAD	5-20 keV	BNL-Biology Cold Spring Harbor Laboratory SUNY @ Stony Brook
X27A	Bend	X-ray microtomography	8-40 keV	BNL-NSLS
X27B	Bend	HARMST	White Beam	BNL-NSLS
X27C	Bend	SAXS WAXS or WAXD XRD, time-resolved	9 KeV	Basell USA, Inc. (formerly Montell) Honeywell International National Institute of Standards & Technology National Institutes of Health Naval Surface Warfare Center New Jersey Institute of Technology SUNY @ Stony Brook U.S. Air Force
X28C	Bend	X-ray footprinting	White Beam	Albert Einstein College of Medicine